GROUP EFFECTIVENESS RESEARCH LABORATORY

DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF ILLINOIS

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Some Cultural Differences in the Perception of Social Behavior

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Communication, Cooperation and Negotiation
in Culturally Heterogeneous Groups

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Fred E. Fiedler, Lawrence M. Stolurow, and Harry C. Triandis
Principal Investigators

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ABSTRACT

Cultural differences in the perception of social behaviors were studied by presentation of 120 social behaviors (e.g., to hit, to command, to obey, etc.) to three samples of respondents: Greek females, American females, American males. The respondents made Thurstone equal appearing interval scale judgements in which the 120 behaviors constituted the stimuli. The judgmental continua were defined by the words: Gives Affect vs. Denies Affect; Gives Status vs. Denies Status; Intimacy vs. Formality and No Trace of Hostility vs. Maximum Hostility. (These dimensions were found to be culture common, between Americans and Greeks, in previous factor analytic work.) Numerous cultural differences in the perception of social behavior were observed. They are discussed in relation to previous studies of American and Greek national character.

Some Cultural Differences in the Perception of Social Behavior [1]

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It is a frequent observation among persons who have engaged in social interactions with persons from other cultures that their behaviors are sometimes "misinterpreted" and their intentions "misunderstood." For example, a person from one culture may provide what he considers to be "friendly criticism" to a person from another culture only to discover that the other person interprets it as "hatred." Or, a person from culture A behaves in a manner which he considers extremely "positive" toward a person from culture B. However, the individual from culture B perceives the behavior as "neutral," and in turn, the individual from culture A feels that he is "given the cold shoulder." His negative reaction is then perceived as negative and a vicious circle of mutual negative reinforcement takes place. One possible explanation of such misinterpretations is that the meaning of the social behavior is not the same across cultures.

As part of a program of research to investigate the behavior of culturally heterogeneous groups, we have tested the hypothesis that cultures will differ in their perception of the meaning of social behaviors.

Method

Selection of a Sample of Social Behaviors: Triandis, Vassiliou, and Nassiakou (1967) asked samples of American and Greek students to supply sentence completions

[1] The data were collected under contract NR 177-472, Nonr 1834(36) with the Advanced Research Projects Agency and the Office of Naval Research to study "Communication, Cooperation and Negotiation in Culturally Heterogeneous Groups" (Fred E. Fiedler, Harry C. Triandis, and Lawrence M. Stolurow, Principal Investigators). Fred E. Fiedler, Uriel Foa, Charles E. Osgood, and David Summers made valuable comments on an earlier version of this paper.

to a set of 100 roles (e.g., father to son; prostitute to customer). The instructions required the Ss to supply a social behavior which they considered appropriate and likely to occur within each of these roles (e.g., father hits son). Samples of about 10,000 behaviors were obtained from each culture, and these were subjected to facet and factor analyses. A variety of factor analytic approaches (including two-mode factor analysis) yielded four culture-common factors. The four major culture-common factors were (1) Giving vs. Denying Affect (defined by high loadings on the behaviors to love, to admire, to help vs. to hate, to despise, to be prejudiced against;) (2) Giving vs. Denying Status (defined by high loadings on obey, be commanded by, accept criticism of, vs. treat as a subordinate, command, give advice to;) (3) Intimacy vs. Formality (e.g., to have sexual intercourse with, to marry, to pet vs. to appoint to important position, to send letter inviting to dinner, let join own club;) and (4) Hostility (e.g., throw rocks at, insult, exclude from the neighborhood.) Sixty American and 60 Greek behaviors having high loadings on one or another of these 4 culture-common factors were selected for the present study.

Procedure: The 120 behaviors mentioned were translated into the "other language," so that a list of 120 behaviors was available in each culture. The list was then presented to psychology students Ss with Thurstone equal appearing interval scale instructions (Edwards, 1957). The Ballin and Farnsworth (1941) graphic-rating method was used. The four continua utilized by the Ss in making their judgments were defined as follows:

"Giving vs. denying affect: Giving affect means to feel positively about the other person. To love is an example of a social behavior which is high on "giving affect." To hate is an example of denying affect. Read all behaviors listed in this sheet. Select the one behavior which you consider to be most extreme in giving affect and place it in category 11. Then select the one behavior which you consider to be most extreme in denying affect and place it in

category 1. Then, judge the other behaviors in this list and place each of them in one of the 11 categories provided to you."

"Giving vs. denying status: Giving status means to make the other person feel strong, powerful, great. Denying status means to make the other person feel weak, powerless, small, To beg is an example of giving status, to command is an example of denying status. Read all behaviors..."

"Formal vs. intimate behaviors: Extremely formal behaviors are the type that a head of state would undertake when interacting with another head of state. To send written invitation to a formal dinner is a formal behavior. Intimate behaviors are behaviors that are likely to occur within the family. To have sexual intercourse with is a very intimate behavior. Of course, this does not mean that all family behaviors are intimate or all behaviors between heads of state are formal. In between the two extremes there are behaviors which might be called informal. Read all behaviors..."

"Hostile behaviors: Hostile behaviors involve doing something which hurts another person. This dimension looks superficially like the denying of affect dimension, but there is actually a difference. For example, a mother may love her child and yet beat him. To beat under these conditions would be high in hostility and also high in giving affect. Read all behaviors..."

The Ss were provided with 11-point scales on which they entered the serial number associated with each behavior. The end-points of the scales were labeled as follows: Gives affect-denies affect; Gives status-denies status; Formal-Informal-Intimate; No trace of hostility-maximum hostility.

Subjects: Three samples of psychology undergraduates were employed: American males, Greek females (there are no males studying psychology in Greece), Since 120 behaviors had to be judged on four dimensions and it was felt that the 480 judgments would lead to fatigue and unreliability, the judgments were randomly divided into 4 equal sets. Each S completed 120 judgments. Since each of the Ss responded to a different combination of behavior-scale judgments, and since

they were also instructed not to make a judgment if they felt that the dimension was irrelevant, the number of judgments obtained had unequal Ns. The Ns for the Greeks ranged from 5 to 45, with a median of 25. The Ns for the Americans ranged from 7 to 30, with a median of 20.

Analysis: The medians of the distributions of the judgments as well as the interquartile range of these distributions were recorded. The medians of the judgments on the 4 dimensions were intercorrelated. Table 1 shows the correlations (N=120) between the samples.

The medians and interquartile ranges obtained for each behavior were employed to determine whether cultural differences existed in the judgments of the behaviors. Only differences significant beyond the .01 level were considered. Thus, we preferred to focus on only the most extreme cultural differences.

Results

Cross-Cultural Similarities

It is clear that the meaning of the four dimensions employed in the two cultures is very similar, otherwise we would not have obtained the high correlations of Table 1. In fact, the meaning across cultures is about as similar as it is across sex groups. Furthermore, Table 2 shows that the Ss did not make the discriminations that we expected them to make. Giving affect apparently implies giving status (e.g., to marry involves giving high affect and status) and low hostility despite our attempts to make the Ss discriminate between these dimensions.

The relationship between affect and intimacy was investigated. A plot of the medians reveals a reasonably clear curvilinear pattern. Extremely intimate behaviors are either extreme in giving affect (e.g., to marry) or in denying affect (e.g., to despise). On the other hand, formal behaviors involve giving moderate amounts of affect. There is, however, one exception to this pattern: behaviors that have a very strong relevance to the giving and denying status dimension (e.g., command, be commanded, appoint to important job) are judged as

Table 1

Correlations between the Medians of the Behaviors on the Four Dimensions

Dimension	Correlations between Medians of		
	American Males and Females	American Females and Greek Females	American Males and Greek Females
Affect	.94	.89	.90
Status	.83	.89	.86
Intimacy	.43	.58	.62
Hostility	.91	.90	.90

N = 120

All correlations are significant beyond the $p < .001$ level.

Note: There are no males studying psychology in Greece.

Table 2

Correlations among the Four Dimensions for American and Greek Females

Dimensions	Americans	Greeks
Affect and Status	.82***	.84***
Affect and Intimacy	-.12	.24*
Affect and Hostility	-.89***	-.93***
Status and Intimacy	-.11	.03
Status and Hostility	-.76***	-.84***
Intimacy and Hostility	.13	-.18*

N = 120

*p < .05

***p < .001

extremely formal and either denying affect (e.g., to command) or giving affect (e.g., appeint...). As a result, the graph of intimacy and affect has points (behaviors) in all four of its corners. Moreover, the behaviors that are found in each corner are rather similar. Thus, the high-intimacy-giving-affect corner has to love, to marry, to have sexual intercourse with, to date, to kiss, to pet, to cuddle, etc., all behaviors identified as part of the Marital Acceptance factor in Triandis' (1964) factor analysis of social behaviors. The high-intimacy-denying-affect corner includes despise, throw rocks at, exclude from the neighborhood, be prejudiced against, etc., all behaviors associated with the Social Distance factor of Triandis's factor analysis. The formal-denying-affect corner has behaviors such as command, be commanded, look down upon, etc. These are behaviors that had high loadings on Triandis's Superordination-Subordination factor. The fourth corner, formal-giving-affect, includes behaviors such as appoint to important job, enjoy working for, obey, let join own club, look up to, etc., which appear similar to the Respect factor of the Triandis analysis. Finally, the Friendship factor of that analysis includes behaviors which involve giving affect, but without formality or intimacy. These behaviors are found in between the Marital and Respect factors in the plot. Thus, the present analysis suggests that the five factors obtained by Triandis (1964) can be reduced to two basic dimensions of interpersonal behavior: affect and intimacy.

Cultural Differences

Cultural differences in the perception of social behaviors were studied by an examination of a table such as Table 3. To save space, the information of Table 3 has been greatly abbreviated.

The perception of a given behavior was considered as being different across cultures if the following two criteria were met: (a) the two American samples were similar while the Greek sample differed from them in one or the other direction on a particular dimension; (b) the difference between the average medians

Table 3: Example of Data Used to Obtain the Cultural Differences

Dimension: Affect

Samples:	American Males			American Females			Greek Females		
Identif. No. of the Behaviors	N	Q_3-Q_1	Median	N	Q_3-Q_1	Median	N	Q_3-Q_1	Median
1	22	1.4	8.2	16	2.0	7.3	20	3.3	7.0
2	17	2.1	8.6	17	2.2	7.5	30	3.0	7.6
3	13	2.3	5.0	15	1.6	5.5	18	4.5	7.3
4	18	3.3	6.9	23	3.3	6.7	24	4.3	6.4
...	...	...	...	...	...	...	...	...	...

Note: For each Dimension there are 120 rows, since there are 120 behaviors. Since there are 4 dimensions, the table has 480 rows.

of the two American samples and the median of the Greek sample was greater than three-quarters of the square root of the average interquartile range of the three samples. This criterion was derived from first principles. It requires the assumption that the medians are the best estimates of the means of the distributions of judgments and the portion of the distribution between the Q_1 and Q_3 points includes 50% of the cases under a normal curve. In other words, it assumes a normal distribution of the judgments. It is designed to yield a p less than .01 when there are 15 Ss in each sample. Since there are usually more than 15 Ss in a sample, this is a conservative criterion.

Examination of entries such as those of Table 3 suggest the following cultural differences:

1. On the Affect Dimension: Greeks see to compete with as implying denying of affect; Americans see it as affectively neutral. Greeks are exceptionally competitive (Triandis & Vassiliou, 1966; Triandis, Vassiliou, & Nassiakou, 1967), with members of their outgroups and non-competitive with members of their ingroup (family and close friends). Competition is not conceived as "a game," in the American sense, but as "deadly serious" activity in which it is not enough to win, but is also important to humiliate the opposition.

Greeks see more giving of affect than do Americans in the behaviors to thank, to praise, and to appreciate. These behaviors occur within the ingroup, but not with members of outgroups. For example, Greeks praise their children rather blatantly, but they almost never praise anyone with whom they are competing.

A similar pattern occurs for to help, to advise, to feel sorry for. As Triandis, Vassiliou and Nassiakou (1967) have shown, these behaviors are most salient in the mother-child relationship, i.e., in a role which is characterized by extreme positive affect. Analyses of the motivational patterns of Greek

adolescents (Vassiliou and Kataki, in preparation)[2] suggest a high frequency of themes in which love is expressed by helping and advising or counseling and absence of these behaviors is interpreted as "lack of love."

The Greeks see more positive affect in the behavior to enjoy working for than do Americans. This behavior in Greece has the connotation that the employee is feeling loyal to the employer, which requires that he "do extra things" to please the employer. Thus, enjoying working for somebody is likely to imply "going out of your way to help him," even when you are not asked to help, if a difficult moment requires additional effort. Conversely, the employees enjoy working for an employer who will be responsive to their idiosyncratic needs, special requests for exemptions from general rules, etc.

Greeks see to complain to as involving giving of affect and intimacy. In Greece one complains to the ingroup and protests to the outgroup members.

On the other hand, Greeks see more denying of affect than do Americans in the behaviors to be indifferent to and to punish. In Greece, parents are quite permissive and employ punishment only after a situation has gotten out of control. Thus, punishment occurs for serious offenses only, in which the relative level of affect is quite negative.

Moreover, Greeks see less giving of affect in look up to, be proud of, and cuddle than do Americans. These behaviors are expected within the ingroup and they are not particularly indicative of extreme affect.

Finally, the Greeks see more denying of affect in to swear at and to envy.

On the Status Dimension: The Greeks see more giving of status compared

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[2] Vassiliou, Vasso and Kataki, Hariklia. Motivational patterns of Greek adolescents and young adults, as obtained from Story Sequence Analyses. In preparation.

to Americans in the behaviors to compete with, reward, flatter, discuss with, inform, learn with help of, compliment, and look up to. On the other hand, they see less giving of status in the behaviors accept as close kin by marriage and have sexual intercourse with.

On the other hand, the Greeks see more denying of status than do Americans on the behaviors to be impatient with, to be indifferent to, to be embarrassed by, to accuse, to envy, to inspect work of, and to protect.

On the Intimacy Dimension: The Greeks see a number of behaviors as more intimate than do the Americans. Thus, to annoy, to quarrel with, to ask for advice of, to scold, to study with, to advise, to complain to, to be grateful to, to hit, to be friend of, to learn with help of, to laugh at jokes of, to enjoy company of, to correct, to like, to kiss, to go to movies with, to protect, to wish good luck to, to share responsibility with, to work with, to be loyal to, to date, are seen as more intimate in Greece than in America.

On the other hand, the Greeks see less intimacy than do Americans in the behaviors to despise, ask for forgiveness, invite to dinner, congratulate, depend upon, mourn for, follow instructions, and be commanded by.

On the Hostility Dimension: Greeks see more hostility than do Americans in to quarrel, to compete, to exploit, to cheat, to be indifferent to, feel inferior to, punish, to be sarcastic to, accept orders from, laugh at, cheat, blame for failure, dislike, and envy.

On the other hand, they see less hostility than Americans in the behaviors grow impatient with, anger, and be prejudiced against.

Finally, the Greeks see practically no trace of hostility, while Americans see some, in the behaviors feel sorry for, teach, talk to, be friend of, compliment, argue with, approve of, confess sins to, go to movies with, work for, be proud of, and understand. Most of these behaviors, except argue

with, are "very positive." The explanation for the argue with behavior is that Greeks argue "for fun" much more than do Americans (Triandis and Lambert, 1958).

Generally, the Greeks tend to exaggerate their judgments on the hostility dimension, so that when a behavior involves giving affect, it is seen as having very little hostility; conversely, when the behavior involves denying affect, it is seen as implying more hostility than is the case for the Americans.

Discussion

There are numerous differences in the perception of social behaviors. Many of these differences appear meaningful to those of us who have been exposed to the two cultures under study. Further research is needed to establish the importance of such differences in the determination of the outcomes of social behavior.

It is notable that on 23 behaviors the Greeks see more intimacy than do the Americans and on only 8 there is the reverse pattern. This result is consistent with the finding of Triandis, Vassiliou and Nassiakou (1967) who found greater perception of intimacy within roles in Greece than in America.

The implication of such differences is that an American interacting with a Greek might behave inappropriately for the level of intimacy that is appropriate at a particular time, because he may not realize that more intimacy is required before the particular behavior is permissible. Thus, for example, he may try to kiss, to quarrel with, to ask for advice of, to advise, to laugh at jokes of, to correct, etc. before the Greek sees that the relationship is "ripe" for "such intimacies." On the other hand, he may wait too long before he invites to dinner, congratulates, mourns for, etc., than would be appropriate from the Greek's point of view since, for instance, a dinner

invitation does not require as much intimacy in Greece as it requires in the United States.

Another kind of "cross-cultural interaction mistake" would be not to realize the significance of certain behaviors in terms of their implications for denying affect. Thus, to be indifferent to, to punish, etc., are seen as denying affect to a much greater extent in Greece than in America. The Greek on his side can make the cultural mistake of assuming that he is reinforcing the American more than he really is when he helps him, advises him, praises, appreciates him, etc.

We might speculate that the degree to which a behavior is seen as involving the giving of affect is related to the extent to which it is reinforcing (using Thibaut and Kelley (1959) language -- the extent to which it provides rewards). Those behaviors that are seen as denying affect provide negative reinforcement, i.e., are costly to the person receiving the behavior. Similarly, giving status and not showing hostility might be conceived as rewarding, while denying status and showing hostility may be thought to be costs.

Any social situation can be characterized by the exchange of reinforcements that are received or given, the level of intimacy (related to the time during which the social relationships exist), and the relative status of the two participants. The cross-cultural differences in the perception of the meaning of these behaviors suggest that it is possible for members of two cultures to perceive the same situation in very different terms, and for the exchange of reinforcements to be very different for the two individuals.

"Interaction mistakes" can occur because of differences in the perception of social behavior not only on the main dimensions of affect and intimacy, but also on correlated dimensions, such as status or hostility. For example, it is reasonable to speculate that when there is a status gap, the high status person may be allowed to deny status and the low status person would be required

to give status. Misunderstandings might occur if a low status American misperceives the amount of status he is giving by accepting as a close kin by marriage or a low status Greek misperceives the amount of status he is giving by competing with, flattering, discussing with, informing, complimenting, and looking up to. In other words, the latter set of behaviors may seem very status giving to the Greek, while the American sees them as only moderately status giving, Thus, a Greek may expect appropriate behavior by the American in exchange for the "extra" status the Greek has conferred on him. If the American fails to perceive the Greek's behavior as "giving status," the Greek is likely to perceive him as "ungrateful."

Finally, Americans may see less hostility in quarreling with, competing with, etc., and thus behaviors which the Americans see as involving very little implication of hostility may arouse considerable hostility among Greeks. On the other hand, the Greeks may see little implication about hostility for growing impatient with while Americans see it as rather hostile.

Thus, the present study suggests that a variety of "misunderstandings" may occur between members of two cultures due to differences in the perception of social behaviors.

Clearly, these are suggestions that need to be tested in further research, but they indicate considerable fruitfulness of the present approach in the determination of which behaviors are appropriate in a cross-cultural setting.

REFERENCES

Ballin, M. and Farnsworth, P. R. A graphic rating method for determining the scale values of statements in measuring social attitudes. Journal of Social Psychology, 1941, 13, 323-327.

Edwards, A. L. Techniques of attitude scale construction. New York: Appleton-Century-Crofts, 1957.

Thibaut, J. W. and Kelley, H. H. The social psychology of groups. New York: John Wiley, 1959.

Triandis, H. C. Exploratory factor analyses of the behavioral component of social attitudes. Journal of Abnormal and Social Psychology, 1964, 68, 420-430.

Triandis H. C. and Lambert, W. W. A restatement and test of Schlosberg's theory of emotion with two kinds of subjects from Greece. Journal of Abnormal and Social Psychology, 1958, 56, 321-328.

Triandis, H. C., and Vassiliou, Vasso. Frequency of contact and stereotyping. Technical Report No. 43. Urbana, Illinois: Group Effectiveness Research Laboratory, 1966.

Triandis, H. C., Vassiliou, Vasso, and Nassiakou, Maria. Some cross-cultural studies of subjective culture. Technical Rpoert No. 45. Urbana, Illinois: Group Effectiveness Research Laboratory, 1967.

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13. ABSTRACT

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Three-Mode Factor Analysis of the Behavioral Component of Interpersonal Attitudes

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Ping Koo, and Thomas Stewart

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ABSTRACT

A three-mode factor analysis was computed using behavioral differential data obtained by Triandis, Tanaka, and Shanmugam (1966) from approximately 100 S's in each of three cultures: America, Japan, and India. Four factors were found for Mode I (behaviors). They were Respect, Institutionalized Marital Acceptance, Friendship Acceptance, and Affect with Submission. The four factors for Mode II (stimuli) were rotated to give factors for sex, age, occupation, and religion. There were six Mode III (subject) factors. The mean loading for each sample on each Mode III factor was computed. The core matrix shows the relationships among the three modes. Interpretation of the core matrix provided information not revealed by classic factor analysis, particularly concerning differences in "points of view" within each of the samples.

Three-Mode Factor Analysis of the Behavioral Component of Interpersonal Attitudes[1]

Harry C. Triandis, Ledyard R. Tucker,
Ping Koo, and Thomas Stewart

University of Illinois

The Behavioral Differential (Triandis, 1964) is an instrument for the study of the behavioral component of interpersonal attitudes. It consists of a description of a person and a series of scales defined by behaviors. The S is asked to indicate his behavioral intentions towards the stimulus persons. For example, a typical item would have the following format:

A 30-year old female, Negro physician

would____:____:____:____:____:____:____:____:____:would not

admire the ideas of this person

would not____:____:____:____:____:____:____:____:____:would

hit this person

etc., etc., etc.

Utilizing such instruments, Triandis (1964) found five clusters of behavioral intentions. Formal Social Acceptance or Respect (admire, obey, vote for), Marital Acceptance (marry, date, love), Friendship Acceptance (eat with, play with, gossip with), Social Distance (exclude from the neighborhood, not

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accept as kin by marriage, prohibit from voting) and Subordination (not treat as a subordinate, be commanded by, submit work for criticism of).

Triandis (1967) reviewed several studies which probed the reliability and validity of the behavioral differential and its relationship to other instruments for the measurement of interpersonal attitudes.

The basic method for the analysis of behavioral differentials was classic factor analysis. Classic factor analysis was designed to reduce a matrix of subjects by tests to a simpler form. Thus, it is applicable to data with a two-way classification. The data matrix can be factored into a product of two matrices: a factor score matrix and a factor loading matrix. However, some instruments require three or four way classifications of the data. For example, both semantic differential (Osgood, Suci, & Tannenbaum, 1957) and behavioral differential (Triandis, 1964) data are usually three-mode.

One mode consists of the concepts, another of the behavior scales, and a third of the Ss responding to the instrument. The concepts are the descriptions of the stimulus persons. The behaviors are described under the scales. The data can be placed in a cube, one side of which has the concepts, another the scales and a third the Ss. Such an instrument requires three-way classification of the data. If we sampled a series of "social settings" as well, we would have an instrument requiring a four-way classification, since the behavior would be described as occurring "in your home," "in church," "in school," "at a medical convention," etc.

In much of the work with semantic and behavioral differentials the Ss' responses to the instruments were summed, so that a matrix of concepts by scales was obtained. Then, the scales were intercorrelated using the concepts as the number of observations on each variable. This procedure gives useful results, but the information about individual differences is lost.

In previous studies of the components of interpersonal attitudes in which behavioral differentials were utilized (e.g., Triandis, 1964; 1967; Triandis & Davis, 1965; Triandis, Vassiliou, & Nassiakou, 1967) the responses of the Ss were summed and the two-way classification matrix (concepts by scales) was the starting point for the analysis. Factor analyses of the scales were then computed.

Triandis and Davis (1965), working with white American males employed a further procedure which gave information about individual differences: After the factor analysis of the scales was completed, they summed the responses of each individual which were obtained when he judged each of the stimulus persons on the three scales which had the highest loadings on each factor. Thus, a matrix of individuals by composite scores (sums of judgments of a stimulus on three scales) was obtained. This matrix was then analyzed by the Tucker and Messick (1963) two-mode factor analysis procedure, thus obtaining "subject" factors as well as "stimulus-on-scale factor" factors. This approach preserves the information about individual differences, but is not as elegant as Tucker's (1964) three-mode factor analysis.

Levin (1965) has presented three-mode factor analyses of semantic differential data. In his paper he summarized the mathematical developments of both two-mode and three-mode factor analyses, so that the reader may refer to his paper or to the original Tucker papers to find the details of these procedures. The present paper presents an application of three-mode factor analysis to behavioral differential data obtained by Triandis, Tanaka, and Shanmugam (1966) from approximately 100 Ss in each of three cultures: America (Urbana, Illinois), Japan (Tokyo) and India (Mysore). A comparison will be made between the results obtained by Triandis, Tanaka, and Shanmugam (1966) using classic factor analysis and the present results using three-mode factor analysis.

Subjects

Samples of 50 male and 50 female Ss were obtained from each of the following places: Urbana, Illinois; Tokyo, Japan; and Mysore, India to participate in the study. However, testing of Indian females proved impossible, because the Behavioral Differential scales (e.g., would marry this person) sometimes included questions that were considered "inappropriate" in that culture, in the sense that "girls should not be asked such questions." Since testing of females was not possible, data were collected from two male Indian samples, so that we do, in fact, have data from about 100 Ss per culture.[2] The Ss were upperclassmen in high or secondary schools (India) or lowerclassmen in universities (America and Japan).

The Questionnaires

Nine stimulus persons were presented first: physician, carpenter, male, female, old, middle-aged, young, a person of the same religion as you, a person of a different religion. The Ss were asked to inspect a list of religions which included all common religions in their particular culture, as well as the option of "no religion," and to pick the one that they considered most different from their own. Then, they were instructed to think of that particular religion when they made their judgments of persons of a "different religion."

The above-listed nine stimuli were arranged in all possible combinations of occupation, sex, age, and religion. This is a 2x2x3x2 design which involves twenty-four complex stimuous persons. A total of thirty-five stimuli were used: nine simple, twenty-four complex, and repetitions of two complex

[2]The exact numbers of the various samples were as follows: American males, 49; females, 49. Indian males, I, 50, II, 49. Japanese males, 55; females, 57.

stimuli as a test of the reliability of the results.

Sixteen Behavioral Differential scales, selected from Triandis (1964) and translated into Kannada (India) and Japanese, constituted the Behavioral Differential part of the questionnaire. The scales may be seen in Table 1.

Analysis of the Data

The data were rescaled from a 1 to 9 scale to a -4 to +4 scale. The raw data were then treated as standard scores, and sums of cross products, rather than correlation, were used throughout the analysis. This procedure has been suggested by Tucker (1966, p. 294) and was used by Levin (1965) for semantic differential data. It is based on the assumptions that 0, the scale midpoint is a natural origin of measurement and that differences in standard deviation among subjects reflect individual differences which ought to be included in the analysis.

The data were processed by IBM 7094 computer. The method used to obtain the factor matrices for each mode and the core matrix was developed by Tucker (1966, pp. 299-301).

Number of factors: The number of factors was determined by plotting the size of the latent roots (eigenvalues). An abrupt change in the slope of this plot was used as a cue. The bending point is used as the cutting point to determine the number of factors.

Using this criterion Mode I (behavior-scales) had 4 factors; Mode II (stimulus persons) had also 4 factors; Mode III (the Ss) had 6 factors.

Relations: The principal axis factors for Mode I (behavior scales) were rotated by the Varimax method (Kaiser, 1958). The Mode II, (stimulus persons) factors were identified by comparing the mean loadings for the two poles of each of the four stimulus characteristics of sex, occupation, age, and religion. For example, if the mean loading for all male stimulus persons on Factor 1,

disregarding age, occupation, and religion, was higher than the mean loading for all female stimulus persons, then Factor 1 could be labeled a sex factor. If there is no difference between the loadings for male and female stimuli, the implication is that the sex of the stimulus person is not relevant on this factor. For each Mode II factor, the mean loading for female stimuli was subtracted from the mean loading for male stimuli. The same was done for carpenter and physician, old and young, and different religion and same religion. These differences formed a 4x4 matrix with columns for factors and rows for stimulus characteristics. The inverse of this matrix, normalized by columns, was the transformation matrix for Mode II. Under this transformation, the difference matrix is diagonal with factor 1 having a non-zero difference for sex, factor 2 for occupation, factor 3 for age, and factor 4 for religion.

The transformation matrices for Mode 1 and Mode LL were used to obtain the transformed core matrix as described by Tucker (1966, pp. 289-291). This transformed core matrix was then written as a two mode matrix with 6 columns for the factors of Mode III and 16 rows for the combinations of Mode I and Mode II factors. This form of the core matrix was rotated by Varimax and the principal axis factor matrix for Mode III (subjects) was counterrotated by multiplying by the inverse of the Varimax transformation matrix.

Results

Interpretation of factors for each mode

Mode I (behavior scales): The behavior scales with high loadings are shown in Table 1. The first factor had high loadings on the following behaviors: Would not exclude from my neighborhood; Would not marry this person; Would not treat as a subordinate; Would permit this person to do me a favor; Would admire the character of this person.

This factor is interpreted as involving RESPECT. It resembles the

Table 1

Behaviors with High Loadings for Mode I

Factor I: Respect

Would exclude from my neighborhood	-.53
Would marry	-.45
Would treat as a subordinate	-.39
Would permit to do me a favor	.29
Would admire the character of	.27

Factor 2: Institutionalized Marital Acceptance

Would marry	.61
Would accept as kin by marriage	.60

Factor 3: Friendship Acceptance

Would accept as an intimate friend	+.55
Would be partners in an athletic game with	+.43
Would teach	+.37
Would gossip with	+.37
Would believe	+.36
Would admire the ideas of	+.35
Would obey	+.29

Factor 4: Affect with Submission vs. No Affect or Submission

Would fall in love with	+.77
Would be commanded by	+.44
Would cooperate in a political campaign with	+.34
Would obey	-.30

FORMAL SOCIAL ACCEPTANCE WITH SUBORDINATION factor found by Triandis (1964) and the RESPECT factor of Triandis, Vassiliou, and Thomanek (1966). Ss often show respect for persons who are older or of the same sex, as they are, hence the loading on would not marry.

The second factor has only two high loading scales: Would marry; Would accept as kin by marriage.

This is interpreted as involving INSTITUTIONALIZED MARITAL ACCEPTANCE. It resembles the MARITAL ACCEPTANCE factor of Triandis (1964), but the absence of a substantial loading on the behavior "would love this person" gives it a definite institutional character. In cultures, such as India, where marriages are arranged, love is an event that follows (if it ever occurs) the selection of the marital partner by one's family. Such selection is determined by institutionalized marital acceptance.

The third factor is characterized by loadings on the scales indicative of FRIENDSHIP ACCEPTANCE.

The fourth factor is interpreted as involving AFFECT WITH SUBMISSION.

Mode II (Stimulus Persons): The average difference matrix of the stimulus, person mode, the derivation of which was described above, is shown in Table 2, which also shows the transformed difference matrix. Table 3 shows the transformed Mode 2 Factor Matrix. Thus, by applying these transformations, we have a Stimulus Person Mode which consists of easily interpretable stimulus characteristics. Factor I reflects the sex of the stimulus persons, with Male high, Female low; Factor II reflects the occupation of the stimulus persons, with Physician high, Carpenter low; Factor III reflects the age of the stimulus persons, with Young high and Old low; and Factor IV reflects the religion of the stimulus persons, with same religion high and different religion low.

Table 2

Average Difference and Transformed Difference Matrices for Stimulus Person Mode

Average Difference Matrix ($_rD_p$)

	I	II	III	IV
Sex (Male-Female)	-.012	.076	-.107	.022
Occ. (Physician-Carpenter)	.041	.070	.021	-.033
Age (Young-Old)	.130	.056	.060	.029
Rel. (Same-Different)	.034	.078	.013	-.085

Note: $_pT_{p*}$ is the inverse of $_rD_p$, normalized columnwise. $_rD_pT_{p*} = {}_rD_{p*}$, the transformed difference matrix.[3]

Transformed Difference Matrix ($_rD_{p*}$)

	I	II	III	IV
Sex (Male-Female)	.107	.000	.000	.000
Occ. (Physician-Carpenter)	.000	.014	.000	.000
Age (Young-Old)	.000	.000	.056	.000
Rel. (Same-Different)	.000	.000	.000	.026

Note: $_jB_p$ is the Mode 2 factor matrix. $_jB_pT_{p*} = {}_jB_{p*}$, the transformed Mode 2 factor matrix.

[3]For explanation of notation, see Tucker (1966).

Table 3

Transformed Mode 2 Factor Matrix ($_jB_{p*}$)

Stimulus Number					Stimulus Characteristics*			
	I	II	III	IV	Sex	Occ.	Age	Rel.
1	-.064	.235	-.206	-.211		P		
2	-.107	.246	-.227	-.251		C		
3	-.105	.246	-.195	-.217				S
4	-.089	.265	-.216	-.282				D
5	-.008	.261	-.229	-.234	M			
6	-.244	.285	-.218	-.280	F			
7	-.120	.277	-.297	-.261			O	
8	-.119	.245	-.260	-.216			M	
9	-.102	.239	-.171	-.213			Y	
10	-.069	.283	-.246	-.295	M	P	Y	D
11	-.030	.271	-.240	-.246	M	P	Y	S
12	-.168	.261	-.266	-.266	F	C	M	S
13	-.144	.258	-.303	-.260	M	C	O	D
14	-.142	.288	-.323	-.257	M	P	O	S
15	-.075	.265	-.270	-.251	M	C	Y	S
16	-.084	.257	-.270	-.268	M	C	Y	D
17	-.137	.270	-.313	-.254	M	C	O	S
18	-.127	.275	-.311	-.256	M	C	M	S
19	-.110	.277	-.294	-.271	M	P	M	D
20	-.179	.270	-.304	-.266	F	P	O	D
21	-.272	.281	-.267	-.241	F	P	Y	S
22	-.246	.297	-.277	-.294	F	P	Y	D
23	-.244	.266	-.273	-.267	F	C	Y	D
24	-.229	.287	-.308	-.258	F	P	M	S
25	-.153	.274	-.313	-.267	M	P	O	D
26	-.175	.262	-.311	-.230	F	P	O	S
27	-.252	.266	-.266	-.246	F	C	Y	S
28	-.206	.275	-.304	-.277	F	C	M	D
29	-.121	.272	-.303	-.231	M	P	M	S
30	-.135	.261	-.288	-.267	M	C	M	D
31	-.199	.277	-.305	-.266	F	P	M	D
32	-.151	.229	-.289	-.231	F	C	O	D
33	-.170	.253	-.312	-.233	F	C	O	S

*Sex: M = Male, F = Female; Occupation: P = Physician, C = Carpenter;

Age: O = Old, M = Middle aged, Y = Young; Religion: S = Same, D = Different.

Mode III (Ss). The means and standard deviations of Mode 3 are shown in Table 6. These were obtained after the counterrotations described in the Analysis section above. Table 6 shows that Subject factor I highs are mostly the Americans plus the Japanese males; factor II highs are the Japanese; factor III highs are the American females; factor IV highs are the Indian males, while IV lows tend to be the Americans; finally, factor V highs tend to be the Indians, and lows the Japanese. The sixth factor is unimportant and difficult to interpret.

The Core Matrix. Table 4 shows the counterrotated core matrix, and Table 5 the same matrix after a further Varimax rotation. The core matrix of Table 5 shows the associations between the three modes.

The top block of 4 by 4 numbers, represents the response patterns of the Ss who are high on Mode 3, Factor I. As mentioned above, these tend to be Americans of both sexes, as well as Japanese males. The Indians tend to be low on this subject-factor. Subjects high on this factor tend to show intimate acceptance of physicians of the same religion. This pattern is interpreted as being equalitarian. Thus, the Americans and also the Japanese males tend to accept physicians of the same religion to intimate relations (accept as intimate friend, fall in love with, be commanded by) (See the loadings in Table 1, for factors 3 and 4), while the Indian males and the Japanese females do not show this pattern. It is possible that for the latter two groups, the particular stimuous persons are too venerable.

The next block of numbers shows the response patterns of Japanese Ss and it is relatively rare with American Ss. It shows an over-emphasis on marital acceptance of the young physicians, and intimate acceptance of those who are young, with a de-emphasis on same religion as being important in intimate relations. It is known that the Japanese consider religion a relatively unimportant determinant of social behavior (Triandis, Davis, &

Table 4

Counterrotated Core Matrix ($_{p*}G_{qm}$)

	Behavior Factors / Stimuli[4]	Resp. 1	I.M.A. 2	F.A. 3	Affect + Sub. 4
Factor 1 for Mode 3					
	Sex (M)	.21	.48	.34	1.41
	Occ. (P)	.29	-1.44	-1.47	-.60
	Age (Y)	.38	.19	.88	.86
	Rel. (S)	-.28	-1.49	-2.81	-2.04
Factor 2 for Mode 3					
	Sex (M)	-.38	.39	.22	-.79
	Occ. (P)	-.51	.41	1.34	-.09
	Age (Y)	-.03	.81	.40	.57
	Rel. (S)	-.62	-1.02	.68	.13
Factor 3 for Mode 3					
	Sex (M)	-.19	.97	.51	.16
	Occ. (P)	-1.49	-2.73	-3.77	-3.15
	Age (Y)	.25	-1.50	-.57	-.54
	Rel. (S)	-1.44	-2.09	-3.45	-2.99
Factor 4 for Mode 3					
	Sex (M)	-.29	-.67	-.43	-1.95
	Occ. (P)	-.64	-.06	.70	.31
	Age (Y)	.05	-.93	-.72	-.42
	Rel. (S)	-.10	.82	1.80	1.37

[4]The letter in parentheses indicates which stimulus characteristic loads higher on the factor.

Table 4
(Continued)

Counterrotated Core Matrix ($_{p*}G_{qm}$)

Behavior Factors		Resp.	I.M.A.	F.A.	Affect + Sub.
Stimuli		1	2	3	4
Factor 5 for Mode 3					
Sex	(M)	.35	-.38	-.28	.75
Occ.	(P)	1.65	1.45	-.45	.43
Age	(Y)	.16	1.38	.88	1.05
Rel.	(S)	1.05	1.04	-1.49	-.85
Factor 6 for Mode 3					
Sex	(M)	-.56	1.13	.42	-.20
Occ.	(P)	-1.46	-1.93	1.74	1.10
Age	(Y)	.08	-2.45	-.99	-.97
Rel.	(S)	-.83	-.42	3.01	2.10

Note 1: p^*G_{qm} is the core matrix counterrotated for the Mode 2 transformation

$$p^*G_{qm} = (p^T p^*)^{-1} p\, G_{qm}$$

Note 2: The core matrix, G_q, is rotated by Varimax.

$$G_q\, q^T q^* = G_{q^*} .$$

Table 5

Varimax Rotated Core Matrix

Stimuli \ Behavior Factors	Resp. 1	I.M.A. 2	F.A. 3	Affect + Sub. 4
Factor 1 for Mode 3				
Sex (M)	-.31	-.17	-.20	-.79
Occ. (P)	.08	1.26	4.49	3.18
Age (Y)	-.22	-.24	-.28	-.25
Rel. (S)	.54	1.46	5.18	4.03
Factor 2 for Mode 3				
Sex (M)	.44	-.46	-.13	1.02
Occ. (P)	1.93	2.19	.28	.42
Age (Y)	.04	3.02	1.77	1.81
Rel. (S)	.94	.06	-2.00	-1.35
Factor 3 for Mode 3				
Sex (M)	.45	-1.65	-.88	-.60
Occ. (P)	1.69	2.64	.50	1.14
Age (Y)	-.16	1.33	.20	.29
Rel. (S)	1.63	2.64	.64	.97
Factor 4 for Mode 3				
Sex (M)	.50	.24	.16	2.20
Occ. (P)	1.10	-.17	-.87	.45
Age (Y)	.06	.26	.51	.21
Rel. (S)	.68	.19	-1.51	-.80
Factor 5 for Mode 3				
Sex (M)	.01	-.29	-.08	-.39
Occ. (P)	.00	1.38	.83	.02
Age (Y)	-.40	.84	-.17	-.36
Rel. (S)	.15	.40	1.09	.70

Table 5

(Continued)

Varimax Rotated Core Matrix

Behavior Factors / Stimuli	Resp. 1	I.M.A. 2	F.A. 3	Affect + Sub. 4
Factor 6 for Mode 3				
Sex (M)	+.08	-.30	-.02	-.07
Occ. (P)	-.21	-.47	+.00	-.03
Age (Y)	-.00	+.00	+.09	-.02
Rel. (S)	-.17	-.48	-.11	-.02

Note: The Mode 3 factor matrix, ${}_{k}C_{q}$, was counterrotated.

$${}_{k}C_{q}({}_{q}T_{q*})^{-1} = {}_{k}C_{q*} .$$

Table 6

Means and Standard Deviations of Mode 3 Factor Loadings

Subject Group		1	2	3	4	5	6
American Females	M	.057	-.061	.106	-.030	-.020	+.054
	s	.099	.124	.257	.075	.120	.167
American Males	M	.037	-.039	-.002	-.049	-.010	+.027
	s	.038	.058	.108	.028	.058	.044
Indian Males	M	-.029	-.020	-.001	.034	.053	+.006
	s	.045	.056	.148	.042	.060	.090
Japanese Males	M	.043	.040	-.013	-.017	-.030	+.031
	s	.051	.036	.052	.045	.106	.064
Japanese Females	M	.008	.043	-.036	-.012	-.050	+.074
	s	.115	.036	.110	.048	.260	.157

Takezawa, 1965). This pattern is also characterized by high respect for physicians and by high affect with subordination for males. Both of these tendencies are known to exist in Japan and are revealed in the emphasis on occupation as a determinant of social behavior (Triandis, Davis, & Takezawa, 1965) and the preference and obedience shown towards men rather than women.

The next block of numbers reflects the response patterns of some American females. This is characterized by high kinship acceptance of physicians of the same religion who are young females, respect for physicians of the same religion, and affect with subordination for physicians. This appears to be a kind of "feminist" point of view which separates some American females from the other samples, particularly the Japanese females.

Factors 4 and 5 represent mostly Indian males, but the first contrasts them with Americans and the second with Japanese. Thus, Factor 4 Ss have a pattern that shows admiration for power (males physicians) and de-emphasizes the importance of religion in the determination of affective bonds (it is a kind of religious tolerance pattern which is not found among Americans), while the factor 5 Ss (who are mostly Indian males and not Japanese) emphasize the importance of religion in intimate relations and show a strong preference for marital acceptance of a female physician who is young and of the same religion as they are.

Finally, factor 6 Ss are mostly females as opposed to males. However, this is a very weak and ambiguous factor and will not be interpreted.

Discussion

The results of the present study differ from those obtained by Triandis, Tanaka, and Shanmugam (1966) using traditional factor analysis in two important respects.

1. The present study obtained four behavior factors -- Respect, Institutionalized Marital Acceptance, Friendship Acceptance, and Affect with

Subordination. The previous study obtained only the first three of the above factors.

2. The present study showed the existence of different "points of view" within each of the samples. Such differences could not have been obtained in the previous study which did not employ a factor analytic model which allows the study of individual differences.

Thus, in the present study, the American females are represented by subject-factors 1 (highs), 2 (lows), 3 (highs), 4 (lows), and 6 (highs). The American males are represented by factors 1 (highs) and 4 (lows); the Indian males by factors 1 (lows), 4 (highs), and 5 (highs); the Japanese males by factors 1 (highs), 2 (highs), and 5 (lows); the Japanese females are represented by factor 2 (highs), 3 (lows), 5 (lows), and 6 (highs). Thus, each of the sexual-cultural groups has a number of different points of view. It is clear, then, that the present analytic procedure reveals differences in point of view among Ss who belong to the same culture.

To sum up, the present procedure appears to provide information which was not obtained by Triandis, Tanaka, and Shanmugam (1966) using traditional factor analytic procedures. It has, therefore, much to recommend itself in studies in which individual differences in point of view are likely to be important.

References

Kaiser, H. F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.

Levin, J. Three-mode factor analysis. Psychological Bulletin, 1965, 64, 442-452.

Osgood, C. E., Suci, G. J., and Tannenbaum, P. H. The measurement of meaning. Urbana: University of Illinois Press, 1957.

Triandis, H. C. Exploratory factor analyses of the behavioral component of social attitudes. Journal of Abnormal and Social Psychology, 1964, 68, 420-430.

Triandis, H. C. Toward an analysis of the components of interpersonal attitudes. In Muzafer Sherif, Carolyn Sherif, and Donald Pl Kent (Eds.), Attitudes, ego involvement and attitude change. New York: Wiley, 1967.

Triandis, H. C., and Davis, E. E. Race and belief as determinants of behavioral intentions. Journal of Personality and Social Psychology, 1965, 2, 715-725.

Triandis, H. C., Davis, E. E., and Takezawa, S. I. Some determinants of social distance among American, German, and Japanese students. Journal of Personality and Social Psychology, 1965, 2, 540-551.

Triandis, H. C., Tanaka, Y., and Shanmugam, V. T. Interpersonal attitudes among American, Indian, and Japanese students. International Journal of Psychology, 1966, 1, 177-206.

Triandis, H. C., Vassiliou, Vasso, and Thomanek, E. K. Social status as a determinant of social acceptance and friendship acceptance. Sociometry, 1966, 29, 396-405.

Triandis, H. C., Vassiliou, Vasso, and Nassiakou, Maria. Some cross-cultural studies of subjective culture. Technical Report No. 45. Urbana: Group Effectiveness Research Laboratory, 1967.

Tucker, L. R. The extension of factor analysis to three-dimensional matrices. In N. Frederiksen (Ed.), Contributions to mathematical psychology. New York: Holt, Rinehart and Winston, 1964.

Tucker, L. R. Some mathematical notes on three-mode factor analysis. Psychometrika, 1966, 31, 279-311.

Tucker, L. R., and Messick, S. An individual differences model for multidimensional scaling. Psychometrika, 1963, 28, 333-367.

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13. ABSTRACT

A three-mode factor analysis was computed using behavioral differential data obtained by Triandis, Tanaka, and Shanmugam (1966) from approximately 100 S's in each of three cultures: America, Japan, and India. Four factors were found for Mode I (behaviors). They were Respect, Institutionalized Marital Acceptance, Friendship Acceptance, and Affect with Submission. The four factors for Mode II (stimuli) were rotated to give factors for sex, age, occupation, and religion. There were six Mode III (subject) factors. The mean loading for each sample on each Mode III factor was computed. The core matrix shows the relationships among the three modes. Interpretation of the core matrix provided information not revealed by classic factor analysis, particularly concerning difference in "points of view" within each of the samples.

14. KEY WORDS

behavioral differential
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three-mode factor analysis